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ABSTRACT

During the 1984-85 academic year, 41 educators representing grade levels from kindergarten through twelfth grade received Project EQUALS inservice education in the Charlotte-Mecklenburg (North Carolina) Schools. The purpose of this two-year study was to describe the impact of that inservice experience from the perspective of the participants one year after the completion of the inservice. The focused group interview technique was used to gather participant testimony regarding their experiences. Categories of responses were discerned from this testimony. Major findings included participants' descriptions of changes in teaching practice, changes in personal attitudes, and changes in student response to mathematics and science instruction following implementation of EQUALS activities in their respective classrooms and schools. The results of interviews held during the second year of the study were compared and contrasted with the results of the first year. While there were additional particulars provided, the predominant themes were unchanged. (Author/CW)

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The Impact of Project EQUALS Inservice:

Testimony of Participating Teachers

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Richard White and Catherine Conwell

University of North Carolina at Charlotte

RUNNING HEAD: Impact of EQUALS

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Abstract

During the 1984-85 academic year, forty-one educators from the Charlotte-Mecklenburg Schools representing grade levels from kindergarten through twelfth grade received Project EQUALS inservice education. During 1985-86, over 70 additional educators participated. The purpose of this two-year study has been to describe the impact of that inservice experience from the perspective of the participants one year after the completion of the inservice. Qualitative research design was employed to solicit descriptive detail of training outcomes from participants. The focused group interview technique was used to gather participant testimony regarding their experiences with the training program. The first interview sessions were conducted in the fall semester of the 1985-86 school year. Patterns or categories of responses were discerned from the testimony of participants.

The categories were presented to the first-year participants at another interview session in the spring semester of the 1985-86 school year. At that time, the participants checked the categories for accuracy and thoroughness to insure that the outcomes were a valid representation of their views and experiences. Major findings included participants' descriptions of changes in teaching practice, changes in personal attitudes, and changes in student response to mathematics and science instruction following implementation of EQUALS activities in their respective classrooms and schools.

Results of the interviews conducted in the 1986-87 school year were compared and contrasted with the results from 1985-86. While there were additional particulars provided and different contextual information cited, the predominant themes were unchanged.

The Impact of Project Equals Inservice: Testimony of Participating Teachers

National studies indicate a serious underrepresentation of females and ethnic minorities in elective mathematics and science courses and careers (Engineering Manpower Commission, 1983; National Science Foundation, 1982). This situation impacts the nation's success in providing a talent pool sufficient to meet the present and future needs for a scientific and technical workforce, and in providing females and minorities with equal economic opportunities. The pool of white males is simply not sufficient to meet current and future needs for the nation's scientists, engineers and technicians (National Science Board, 1983).

However, the recruitment of women and minorities into these fields has been difficult. A major problem affecting recruitment is the low enrollment of women and minorities in advanced secondary science and mathematics courses which are prerequisites for scientific and technical jobs. Frequently, females and minorities withdraw from secondary mathematics and science courses as soon as it becomes optional. As a result, they exclude themselves from a wide range of technical careers. According to Sells (1974), ability in mathematics functions as a "critical filter" in society. Therefore, in order to have a wider range of career options in science and technology, females and minorities must be encouraged to pursue advanced science and mathematics coursework at the secondary and elementary levels.

EQUALS (Kaseberg, Kreinberg & Downie, 1980) is an innovative appproach for addressing the problem of underrepresentation of females and minorities in mathematics and science courses and careers. A major component of the program is a 30 hour inservice training program for mathematics and science teachers, counselors and administrators. The purposes of the training are to provide teachers with awareness of the problem of female and minority underrepresentation, methods and materials which encourage improved confidence

and competence among female and minority students in mathematics and the sciences, and information which documents the importance of science and mathematics content to future career choices.

The EQUALS program has been introduced in numerous training sites across the nation. The program was first implemented in the Charlotte-Mecklenburg Public Schools in 1984-85 and continues to the present. Much short-term evaluation of training effectiveness has been conducted by funded sites yielding positive feedback. For example, at the end of each training day, participants rate the effectiveness of the overall training and each training activity. However, little systematic research has been conducted regarding the long-term impact of the training on participating teachers. Program proponents have not been able to describe fully the changes in teacher and student attitudes, knowledge or skills which develop from the EQUALS experience. The purpose of this two-year study was to describe in detail the outcomes of the training from the perspectives of participating teachers.

Method

Subjects

Forty-one teachers, counselors and administrators who were participants in the EQUALS training in the 1984-85 academic year were involved in the first year of the study. The respondents included 6 assistant principals, 1 counselor, 9 secondary teachers from two high schools, 9 junior high teachers from four junior highs, and 16 elementary teachers from four elementary schools.

In the 1985-86 academic year, 70 educators participated. The subjects in the second year included 9 secondary educators from four high schools, 19 junior high educators from five junior highs, and 42 elementary educators from nineteen elementary schools (Figure 1).

Insert Figure 1 About Here

Design

A qualitative research approach termed emergent naturalistic design (Guba & Lincoln, 1981) was employed. The purpose of the approach is to discover and characterize the experience of involved respondents. The outcome is detailed description of various respondent perspectives. The attempt to gain understanding of events from the participants' views has been referred to as the pheneomenological or naturalistic tradition in social science research (Bogdan & Biklin, 1982). The focused-group interview technique was used to gather participant testimony (Brenner, Brown, & Canter, 1985; Patton, 1981; Merton and Kendall, 1946). The technique enables data collection from multiple respondents and prompts the description of multiple perspectives which is a major purpose of naturalistic inquiry.

Procedures

The interviews for each year of the study were conducted in the fall following the year of inservice. The intent was to gather perspectives that had stabilized with time. The respondents were grouped by grade level and job role. Principals , secondary teachers and counselors, junior high teachers and elementary teachers were grouped and interviewed. The interviewers for the first-year group included the authors, members of the EQUALS staff who had provided little of the actual training, and two staff members from the University of North Carolina-Chapel Hill who had no experience with EQUALS but were experts in the focused-group interview technique. The research team for the second-year subjects included the authors, other UNCC education faculty, a UNCC Mathematics professor and mathematics and research consultants form the North Carolina Department of Public Instruction. The research teams reviewed and discussed the

purposes, style, orientation and general protocol prior to the interview sessions.

A general protocol was developed by the research teams in conjunction with the EQUALS staff which included the following questions:

1. Do you teach differently or act differently in the classroom since your training? Is your teaching, counseling or administrative behavior different in any way?
2. Does your classroom look any different since the EQUALS training?
3. Do you think differently about your instruction since your EQUALS training?
4. When you think of your Equals experience, what major thoughts come to mind? What are the major learnings you have acquired, if any?
5. What are the problems with the training? Why do those problems exist? How have you coped with those problems?

Within naturalistic inquiry, protocols serve only as a point of departure for encouraging responses (Patton, 1981, p. 201). Many of the actual questions take the form of requests by the interviewer for clarification or greater specificity. Respondents are also encouraged to question each other. The interviewer attempts to keep the discussion focused without constricting the discussion. Interviewer field notes and audio-tapes were used to record testimony during the sessions.

Data Analysis

Data analysis within emergent design consists of the process of unitizing, categorizing and characterizing the qualitative (narrative) data. First, transcripts of the audiotapes were developed with some description from the field notes inserted. Then, single items of information (e.g., discrete descriptions, claimed problems and barriers) were unitized onto individual index cards. The researcher then attempts to cluster or categorize cards that have a unitary theme or pattern (Guba & Lincoln, 1981). These categories are then characterized or named and represent the findings of the study. The reported results, therefore,

are descriptions of the categories and contextual information related to the categories. The process of categorization was conducted collectively by the research team and EQUALS staff after the first year interviews had been transcibed and unitized onto the cards.

When using an emergent approach, results are validated by the respondents of the study, a process termed "member-checking". Respondents are asked to determine the degree to which the categories as delineated represent or characterize their testimony. Once the categories were developed and the results written by the research team, the categories and the analysis of the respondents' testimony across the developed categories were presented to the first-year respondents the following spring semester. The groups were reconvened but the interviewers were changed in an attempt to stimulate straightforward critique of the results. Respondents were asked to critique the degree to which their testimonies were accurately portrayed by the categories and to recommend modifications to the draft of the written results.

After completion of the interviews of the second-year participants, a comparative analysis was conducted between the first and second-year transcripts. The authors reviewed the transcripts from the second year and attempted to identify testimony which was discordant or discrepant with the first year results. The research team, except for the authors, and all of the second-year participants were unaware of the categories developed from the first-year interviews.

Results

The impact of the EQUALS training on teaching practices, personal attitudes, school and community relations and student responses to instruction were major themes discussed by respondents. Much of the testimony related to changes in teaching practices. Changes in teacher practice included categories concerning changed emphases, changed activities and changed strategies. Changes in

self-esteem, self-confidance, expectations toward students and attitudes toward equity were major categories related to impact on the personal attitudes theme. New levels of collaboration among faculty and with parents were chronicled. Changes in student responses included categories in the areas of problem-solving, motivation toward academic work and redefined notions of competence. Description of the various categories and subcategories, related to the major themes, which resulted from the analysis of the units follows. An outline of the categories and sub-categories is available in Figure 2.

No changes in the outline of categories discerned by the research team were made as a result of the validation and critique by first year participants nor by the comparative analysis with the second year interviews. Particular additions, clarifications and modifications were identified and these were incorporated in the following results.

Insert Figure 2 About Here

1.0 Changes in Teaching Practices

As stated before, the bulk of the testimony provided by the teachers was related to differences in emphasis, strategies and activities in their instruction. The testimony in this area substantiated many of the stated objectives of the EQUALS training. Teachers described new perspectives and practices concerning problem-solving, cooperative learning, career orientation and use of stations.

1.1 Perspectives and Practices on Problem-Solving

Prior to their training, many teachers avoided problem-solving instruction.

> "In the past, when the kids couldn't do problems, I'd tend to skip them, and not emphasize them. I've changed my reasoning on that. Now, that's where I concentrate."

A major difference described by teachers was a shift from an instructional style that emphasized the correct answer to one that emphasized the problem-solving process.

> "Another changed thing for me is spending more time on problem-solving than just getting the answer. I have them explain how they got the answer, and if someone else has a different problem-solving strategy, we'll talk about that."

Multiple strategies for promoting problem-solving were discussed by various participants during the interviews. How to use these strategies to a greater degree was the challenge for them. And, in attempting to emphasize problem-solving for the students through their instruction, teachers had become problem-solvers themselves in planning their lessons.

> "For me as much as anything, its been a change in my way of thinking. Every time I can now, even though it's never been something I felt that I needed, I'm trying to find a new way to put it together, or another way to look at it—even in algebra."

The administrators and counselor group felt that EQUALS made the use of models and manipulatives much more acceptable to the secondary teachers.

1.2 Perspectives and Practices on Cooperative Learning

For some teachers, at the secondary level in particular, cooperative learning was an innovation. An assistant principal said:

> "Three of my teachers were more inclined from the beginning to do group activities, to do that kind of thing. But one was a traditional teacher. But this teacher has changed her approach. I see her using group activities even in social studies."

Much of the testimony in this area dealt with the benefits the teachers had perceived from using the approach and their surprise regarding the effectiveness of the approach. Student willingness to question, guess and explore in small cooperative group format was described by a junior high teacher.

> "I think with cooperative learning students feel more comfortable because they aren't held responsible for an incorrect response. If I'm teaching to the class and I ask a question, and one person gets the answer wrong, they feel bad. But in a group, they are able to share. All kinds of sharing and ideas are exchanged. They are more eager to

respond in a group than they are just one-on-one with the teacher."

There was hesitancy and discomfort expressed toward cooperative learning, however. Teachers who felt that cooperative learning opportunities would exacerbate classroom management problems were not comfortable with this practice. The less secure the teacher was about classroom management, the less supportive the teacher was about cooperative learning.

1.3 Perspectives and Practices on Use of Stations

Positive testimony in this area concerned the attractiveness of the stations for the students and the effect upon classroom management.

A secondary teacher said:

> "My room is a more interesting place because of stations. When you walk in my class there's five or six things to do. So if a kid comes in early, or finishes his work in class there's something to do. And its interesting work, not busy work. Its something that helps them."

The major barrier to the full implementation of EQUALS was the time necessary for making the stations.

> "My problem is I don't have that many. I just don't have time to make all I would like to have. During workdays I asked my principal for time to construct some but meetings came up I could never get to it."

The participants recommended that some time for training be allotted for station-making. Others discussed using teacher assistants, parents and volunteers to make stations. The time for constructing stations was a perceived impediment to sharing the EQUALS program with untrained teachers. One participant said:

> "I think this issue (station making) is what keeps other teachers from following through. I have the impression when they come into my room and see the stations that they feel 'Hey this is great, but I could never find the time to do all this.'"

For several respondents, familiarity with the stations was essential for implementation of stations in the classroom. The stations that were introduced

in the training were the ones they chose to use for their students. Ability to solve the station was not important, according to the testimony, but a working familiarity with the station was important.

Several groups mentioned another potential or perceived problem associated with the use of stations. The school system studied is currently involved in an extensive innovative Career Development Program that entails much teacher evaluation and observation. Several groups were concerned that station involvement and student to student talk might be construed as off-task behavior by observers who were not aware of the benefits of cooperative learning. This problem was discussed in relationship to the cooperative learning theme as well. Teachers who were wary of classroom management problems were also more fearful of using stations. Some of these teachers would duplicate station activity material for each child to be worked individually at the student's desk.

1.4 Perspectives and Practices in Career Education

Many participants described a greater sensitivity and awareness in their perceptions of the problem of under-representation of females and minorities in mathematics and science related careers. Many also described more frequent attempts at integrating academic instruction with career opportunities. A secondary teacher said:

> "I did career activities before, but I'm so much more conscious of it now. I'm so much more consciously making sure that I incorporate a lot more career counseling into what they're doing."

An elementary teacher echoed those perceptions:

> "I think EQUALS has made me emphasize careers much more. In the Health book the first chapter is on careers. EQUALS fits right in. They want to be paleontologists and other things that they can't even spell.

One of the strategies encouraged by the EQUALS training is the use of female and minority role models to motivate mathematics and science career aspirations. Teachers across grade levels testified to the impact of that experience upon

their students.

Teachers and counselors at the secondary level described greater care and concern in counseling female and minority students regarding course selection. Elementary teachers tended to discuss the issue in terms of encouraging more awareness now, but actual changes in career aspiration were considered to be long-term future goals.

1.5 Practices in Other Content Areas

Elementary and some junior high level teachers have responsibility for instruction in other content areas. Testimony from those teachers indicated that the EQUALS experience influenced their instruction in the other content areas as well.

> "Venn diagrams carry over into any subject. EQUALS is so diversified. In social studies, the Hurkle activity carries over into map reading. Its so hard for the children to get but if they've played Hurkle, they get it much better. My children are getting map reading so much better this year since I've had EQUALS than before I had EQUALS. It's so diversified. In reading, when we are problem-solving for comprehension, it relates. You can use it in any subject area."

But, this phenomenon was also experienced by teachers at the secondary level.

> "We start to show that every subject is related: series and their circuits and their resistances to Algebra II, Physics to Math Analysis, Binomial Expansion to Genetics.

EQUALS provided different modes of instruction that impacted the totality of teaching. Testimony from teachers at all levels corroborated the following high school teacher's explanation:

> "Instead of an activity, EQUALS is an approach to education. Its the way you approach the subject area, the problem-solving and visualization. I use that now with all my classes. I wouldn't say I have an EQUALS activity day, it's really integrated into all my teaching. That's the way it's supposed to be."

2.0 Changes in Personal Attitudes

2.1 Self-Confidence and Esteem

In the process of attempting to learn teaching strategies which would improve mathematics and science performance of students, teachers described an acquisition of new confidence and esteem for themselves.

> "For me what was really exciting about EQUALS is that I was afraid to try math. I did okay in math--I got As and Bs in school but it was always a threat. Boys could always do better than girls. I was always afraid of it. But for the first time math really made so much sense."

The new self-confidence in mathematics and science fostered a new confidence in teaching mathematics and science.

> "I'm much more of a liberal arts person than I am math and science and I was really hesitant to participate. But this has given me a lot of confidence. Having the feeling that if I can do it, anybody can do it, and then carrying it back to school so the kids can see how many different ways they can use these things in all walks of life--it just amazes me."

These changes were discussed primarily by elementary level teachers or teachers without a mathematics or science content area background.

2.2 Expectations for Students

Expectations regarding individual student performance in mathematics and science develop over the course of the year. They expect high achievement from those who have demonstrated high achievement previously and expect less from those with a history of lower achievement. Teachers testified that EQUALS activities often altered these expectations in a very positive way.

> "I have children who still do not know their multiplication tables. But if I give a minute mystery (an EQUALS activity), they have been the first to get it."

A junior high teacher stated,

> "That's the beauty of the EQUALS program. The children in the class, no matter what the reading level, when we give them an EQUALS activity, they are all working together to find the answer and are all on the same level at that time. And it's just amazed me how often it is

the unlikely child who finds the solution and its a real thrill for them and for the classroom teacher to find activities that will reach all levels."

2.3 Perspectives on Equity

Teachers testified that the inservice affected their sensitivities toward equity not only in the instruction of mathematics and science but in general. The sensitivities discussed took the form of an ongoing alertness to sexism and racism in everyday common events.

> "I know for me the EQUALS training has made me a little more sensitive to giving attention to my girls and minorities. You really don't know if you're treating children differently unless you have an outside observer but I know I am more conscious about it."

An elementary teacher provided the following account:

> "We have a unit on Community Helpers in social studies. We always have community helpers such as fire fighters assigned to visit the school. The Equals teachers noticed that there were no female fire fighters included in the group provided us this year. We made an issue of that."

2.4 Excitement for Teaching

Teachers descibed new excitement for teaching which they attributed to their EQUALS experience. The following two high school teachers' testimonies illustrate that outcome.

> "I don't feel so dry, like I just teach problems off of page 82 of the Algebra I book. I draw in other resources--career things and problem-solving things. Its not just turn to page 88. Math is so boring that way."

> "I am happier with my classes. There is happiness there and I'm enthusiastic about it. I'm happy about it and like it."

3.0 Changes in Relations with Colleagues and Community

3.1 Collaboration with Colleagues

Teachers descibed in the interviews increased collaboration with other EQUALS-trained faculty, untrained faculty and support staff. The shared experience of the EQUALS training fostered comraderie among the trained faculty

with the participating schools. Speaking for a secondary level team, one teacher said:

> "We call ourselves the EQUALS team. We meet once a month to share experiences. A rapport has grown among the group to share and support each other."

Another participant spoke for an elementary team:

> "We didn't have it (teamwork) before.(Laughter by other members). EQUALS has helped it-encouraged it. I have learned to like the help. We have come together more."

As part of the agreement to partake of the training, teachers had to agree to share with untrained teachers. The sharing had varying levels of success. Impediments to the sharing were described. Untrained teachers did not have the same opportunity to work through lack of confidance. Without the shared experience and peer support, untrained teachers found it more difficult to embrace new perspectives and practices.

3.2 Collaboration with the Community

Charlotte Equals incorporated a Family Math (Thompson, 1985) component into the training. And support for Family Math was provided by both elementary and junior high teachers. An elementary teacher said:

> "The parent response was, 'More of it!' And they too could see their children come up with the solutions as quickly or quicker than they could. One parent commented it was more fun when a parent got the solution--too often the children were getting the solution first. One other parent commented that they felt much closer to the teacher personally after doing the activites.
>
> We even had one parent who came back from Family Math and told us she had brought the activity to work and all her co-workers were trying to find the solution. In fact she works in a nursing home and she used the pattern blocks and other activities with the residents. So there was real carry-over to the community."

A junior high assistant principal described how parents provided their EQUALS team support in making stations.

> "Parents get into it too. Our parents helped make stations and they got into doing the problems."

4.0 Changes in Student Attitudes and Responses

The testimony so far has characterized the impact of the EQUALS experience upon teachers and other instructors, including parents. The participants also testified, however, that new instructional perspectives and practices challenged students in new and different ways. Changes in student persistence, motivation and future aspriations were described.

4.1 Persistence in Problem-Solving

EQUALS activities challenge the ability of students to persist in problem resolution over an extended period of time according to respondents.

> "EQUALS activities also force the children to think and act differently. They will say "This isn't in the book. There's no adding or subtracting in this. What is the answer?" They want the answer right away. There's things out there that take awhile to solve. The ones who haven't been exposed to it really need to learn to be patient."

4.2 Confidence and Courage

Most of the testimony of the participants regarding student responses covered this concern. Their teachers especially enjoyed sharing instances when the children outperformed their parents or teachers on an EQUALS activity and what an apparent confidence booster those instances were. One such episode follows:

> "I can brag on one child in particular. Several of us (teachers) had struggled over 'Wolves in Pens.' We struggled hours and hours and eventually got it. This child got it in about ten minutes. Her assistant is a student at UNCC and she took it out to some engineering students and she said they struggled hours over it too."

The willingness to take risks and try difficult problems was a common facet of the testimony. Testimony from another teacher highlights the importance of this element of EQUALS.

> "They may fail at memorizing but they can problem-solve. So in the upper grades, I see it as an ego-lifter for them. It makes them more daring to try. And working with other students encourages them to try. Let me try- let me see if I can do it.

4.3 Motivation

According to the testimony, EQUALS activities motivate students i. mathematics and science.

> "I want to tell you something that happened on Friday. The administrative assistant was being nice to me and took the kids to play a volleyball game with another class. The game went longer than their break. It cut their EQUALS time short and the kids were very upset."

Another teacher added:

> "This is another thing I have found out. With EQUALS problems, they will take them home or think about them after class. I have had children come up to me at lunch and ask questions about them."

4.4 Future Aspirations

The testimony on student aspirations consisted of descriptions of small steps or slight shifts in student thinking about future careers that had much meaning to the participants. A student who changed her mind about enrolling in a course, a student beginning to think that College might be for her, and a willingness by a student to visualize herself in a scientific career are examples of these changes.

Discussion and Conclusions

The participants described themselves as changed instructors. In spite of strong and repeated attempts by the interviewers to elicit comment regarding lack of impact and perceived irrelevancies or impracticalities associated with the EQUALS inservice, little testimony in that regard was provided. The phenomenology was quite positive.

The major problems with the application of EQUALS were constraints of time, energy and competing activity demands upon the production of stations and the dissemination of EQUALS to other faculty. Major impact involved changed instructional practice which the teachers found effective and enjoyable. Participants described a shift in instruction from:

1. Computational to problem-solving activity.

2. Short-term to longer term problem-solving
3. Exclusive reliance on paper-pencil formats to more use of manipulatives at stations.
4. Whole group and homogeneous skill-group arrangements to the inclusion of more individualized and heterogeneous and cooperative group alternatives.
5. Lack of emphasis on careers to greater integration of career content.

Additional qualitative and phenomenological research across EQUALS sites by independent researchers would enhance these findings. Most sites have the potential for soliciting such data already through the use of EQUALS journals (diaries of the teachers' experiences related to the EQUALS training) and the evaluation "comment cards" handed in by teachers at the conclusion of the training. With only slight modifications, these data could have much more value and substantially contribute to the qualitative data-base.

Most importantly, these results ought to motivate observational analyses to corroborate the testimony. Many of the changes described by teachers are concrete and low-inference. For example, it is clear whether EQUALS stations are or are not present. It is evident whether time is allocated for cooperative learning or not. The frequency of questions which ask the child to discuss her strategy is easily and probably most reliably measured. Designs which entail repeated measures from the onset of training to the conclusion of training should provide startling results given this testimony. According to the participants of this study, the change was dramatic and relatively speedy.

Research on change in teacher behavior is a clear pre-requisite to research on student change. For underrepresentation of females and minorities in mathematics and science careers and inequitable performance measures in mathematics and science to be ended, changes in instruction must first take place.

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Subjects

Session I: Fall 1985

Subjects	Schools Represented	Interviewer
Principals (6)	6	EQUALS Planning Team Member
Secondary Teachers/ Counselors (10)	2	UNC-CH Research Asst.
Junior High Teachers (9)	2	UNC-CH Research Asst.
Elementary Teachers: Group 1 (8)	2	Author: UNCC Educ. Professor
Elementary Teachers: Group 2 (8)	2	Author: UNCC Science Ed. Prof.

Session I Subject Total: 41

Session II: Fall 1986: Day 1

Subjects	Schools Represented	Interviewer
HS and JHS Subjects (7)	2	State Dept. Consultant
Elem. School Subjects: Group 1 (8)	2	UNCC Math Professor
Elem. School Subjects: Group 2 (7)	5	State Dept. Consultant
Elem. School Subjects: Group 3 (7)	3	UNCC Science Educ. Professor

Figure 1

Session II: Fall 1986: Day 2

Subjects	Schools Represented	Interviewer
HS Subjects (7)	3	State Department Consultant
JHS Subjects: Group 1 (8)	3	State Dept. Consultant
JHS Subjects: Group 2 (6)		UNCC Science Educ. Professor
Elementary Teachers: Group 1 (10)	4	UNCC Math Professor
Elem. School Subjects: Group 2 (10)	5	Author:UNCC Educ. Professor

Session I Subject Total: 41

Session II: Day 1 Total: 29

Session II: Day 2 Total: 41

Overall Subject Total: 111

Figure 1
(cont.)

Outline of Categories:

Teacher Perceptions of the Impact of EQUALS

1.0 Changes in Instructional Perspectives and Practices

- 1.1 Perspectives and Practices on Problem-Solving
- 1.2 Perspectives and Practices on Cooperative Learning
- 1.3 Perspectives and Practices on Use of Stations
- 1.4 Perspectives and Practices on Career Education
- 1.5 Practices in Other Content Areas

2.0 Changes in Personal Attitudes

- 2.1 Self-Confidence and Esteem
- 2.2 Expectations for Students
- 2.3 Perspectives on Equity
- 2.4 Excitement for Teaching

3.0 Changes in Relations With Colleagues and Community

- 3.1 Collaboration With Colleagues
- 3.2 Collaboration With Community

4.0 Changes in Student Attitudes and Responses

- 4.1 Student Persistence in Problem-Solving
- 4.2 Student Confidence and Courage
- 4.3 Student Motivation
- 4.4 Student Aspirations

Figure 2